

PATENT ABSTRACTS OF JAPAN

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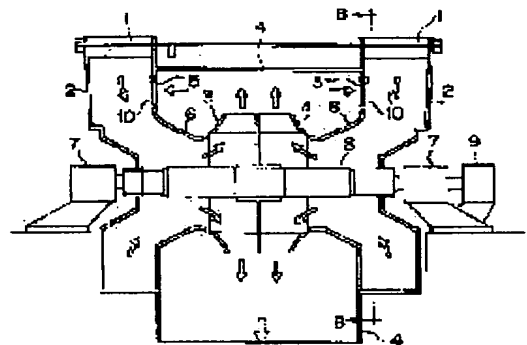
(72)Inventor : ARIMURA HISATO

(54) CENTRIFUGAL FAN

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent an impeller from suffering from its rotational stall together with prevention of a resultant pressure variation so as to enable an eccentric fan to make its stabilized running, by providing a bypass hole in a bulkhead for partitioning a suction casing from a discharge casing and forcing a bypass damper for opening/closing this bypass hole to make linking connection to a suction damper.

SOLUTION: An eccentric fan has its rotary shaft 8 driven by means of a motor 9 and air is sucked in an impeller 3 through a suction damper 1 and a suction casing 2 following the rotation of the impeller 3 and after being increased in its pressure, ejected from a discharge casing 4. In this case, a bypass hole 10 is formed in a bulkhead 6 for partitioning a suction casing 2 from a discharge casing 4 so as to open/close this hole 10 by means of a bypass damper 5. The bypass damper 5 is placed in its linking connection to one of the blades of the suction damper 1 through one link and fully opened when the suction damper 1 is fully closed and when the opening degree of the suction damper 1 becomes about 20%, it is fully closed so as to effectively prevent the rotational stall of the impeller from taking place.



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CLAIMS

[Claim(s)]

[Claim 1]A centrifugal fan carrying out the interlocking linkage of the bypass damper which establishes a bypass hole in a septum which divides the above-mentioned suction casing and a discharge casing into suction casing in a centrifugal fan who provided a suction damper which consists of a braid of two or more sheets, and opens and closes this bypass hole to the above-mentioned suction damper.

[Claim 2]The centrifugal fan according to claim 1 carrying out an interlocking linkage so that the above-mentioned bypass damper may serve as full close when the above-mentioned bypass damper is opened fully when an opening of the above-mentioned suction damper is full close, and an opening of the above-mentioned suction damper becomes about 20%.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]It is related with this invention and a centrifugal fan.

[0002]

[Description of the Prior Art]It is a sketch cross-sectional view in which one example of the conventional centrifugal fan is shown in drawing 3 and drawing 4, drawing 3 meets sketch drawing of longitudinal section, and drawing 4 meets the B-B arrow of drawing 3. in drawing 3 and drawing 4 -- 1 -- as for a discharge casing and 7, suction casing and 3 are [the axis of rotation and 9] drive motors a bearing and 8 an impeller and 4 a suction damper and 2.

[0003]If the axis of rotation 8 drives with the drive motor 9 at the time of a centrifugal fan's operation, After the impeller 3 fixed to this rotates, air is inhaled by the impeller 3 through the gap and the suction casing 2 of the braid of two or more sheets of the suction damper 1 in connection with this and pressure up is carried out by this impeller 3, it is breathed out through the discharge casing 4. A centrifugal fan's air capacity and pressure are controlled by adjusting the opening of the suction damper 1.

[0004]

[Problem(s) to be Solved by the Invention]If a centrifugal fan's air capacity is reduced in the above-mentioned conventional centrifugal fan by making the opening of the suction damper 1 about 20% or less, There was fault that a rotating stall occurred in the impeller 3 and vibration occurred into a centrifugal fan and the duct before and behind that by the pressure fluctuation of 2/3 of the number of rotations N of the impeller 3 or the cycle of 3/4 based on this.

[0005]

[Means for Solving the Problem]A place which it is invented in order that this invention may solve an aforementioned problem, and is made into the gist, In a centrifugal fan who provided a suction damper which becomes suction casing from a braid of two or more sheets, A bypass hole is established in a septum into which the above-mentioned suction casing and a discharge casing are divided, and a centrifugal fan carrying out the interlocking linkage of the bypass damper which opens and closes this bypass hole to the above-mentioned suction damper has.

[0006]There is a place by which it is characterized [other] in having carried out the interlocking linkage so that the above-mentioned bypass damper might serve as full close, when the above-mentioned bypass damper is opened fully when an opening of the above-mentioned suction damper is full close, and an opening of the above-mentioned suction damper becomes about 20%.

[0007]If a deer is carried out, a suction damper is interlocked with, a bypass damper is opened and closed and a bypass damper serves as open, some compression fluid in a discharge casing will circulate in suction casing through a bypass hole, and it will be again inhaled by impeller.

[0008]

[Embodiment of the Invention]It is a sketch cross-sectional view in which the embodiment of this invention is shown in drawing 1 and drawing 2, drawing 1 meets sketch drawing of longitudinal section, and drawing 2 meets the B-B line of drawing 1. The bypass hole 10 is formed in the septum 6 into which the suction casing 2 and the discharge casing 4 are divided,

and this bypass hole 10 is opened and closed by the bypass damper 5.

[0009]And this bypass damper 5 is constituted so that it may become full close, when the interlocking linkage was carried out via one and the link 11 of the braid of the suction damper 1, it is opened fully when the suction damper 1 is full close, and the opening of the suction damper 1 becomes about 20%. Other composition is the same as that of the conventional thing shown in drawing 3 and drawing 4, gives the same numerals to a corresponding member, and omits the explanation.

[0010]If the opening of the suction damper 1 is extracted and it goes in order to carry out a deer and to reduce a centrifugal fan's air capacity, If the bypass damper 5 begins to open, the opening of the bypass damper 5 becomes large according to the opening of the suction damper 1 becoming small and the suction damper 1 serves as full close when the opening becomes about 20%, the bypass damper 5 will be opened fully.

[0011]In this way, if the bypass damper 5 opens, a part of air by which pressure up was carried out will circulate from the discharge casing 4 to the suction casing 2 through the bypass hole 10 by the impeller 3, Since the quantity which flows when the opening of the suction damper 1 is made into about 20% at the impeller 3 is absorbed, a rotating stall can be prevented from occurring in the impeller 3.

[0012]As mentioned above, although this invention was explained about the example which applied the double suction centrifugal fan, this invention can be applied also to the centrifugal fan of single suction, and, of course, a working fluid is not restricted to air.

[0013]

[Effect of the Invention]In this invention, if a suction damper is interlocked with, a bypass damper is opened and closed and a bypass damper serves as open, some compression fluid in a discharge casing will circulate in suction casing through a bypass hole, and it will be again inhaled by the impeller. Therefore, since the air capacity which a rotating stall does not always produce flows through to an impeller, a rotating stall can be prevented from arising in an impeller. As a result, while being able to prevent the vibration of a centrifugal fan and a duct based on the pressure fluctuation based on a rotating stall, and this, it becomes possible to be stabilized and to operate a centrifugal fan regardless of the opening of a suction damper.

[0014]When the opening of a suction damper is full close, a bypass damper is opened fully and the opening of a suction damper becomes about 20%, Since an impeller can be made to inhale predetermined air capacity in a centrifugal fan's low flow rate region if an interlocking linkage is carried out so that a bypass damper may serve as full close, the rotating stall of an impeller can be prevented effectively.

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[Brief Description of the Drawings]

[Drawing 1] It is sketch drawing of longitudinal section showing the embodiment of this invention.

[Drawing 2] It is a sketch cross-sectional view which meets the B-B arrow of drawing 1.

[Drawing 3] It is the conventional centrifugal fan's sketch drawing of longitudinal section. **.

[Drawing 4] It is a sketch cross-sectional view which meets the B-B arrow of drawing 3.

[Description of Notations]

- 2 Suction casing
1 Suction damper
3 Impeller
4 Discharge casing
6 Septum
10 Bypass hole
5 Bypass damper

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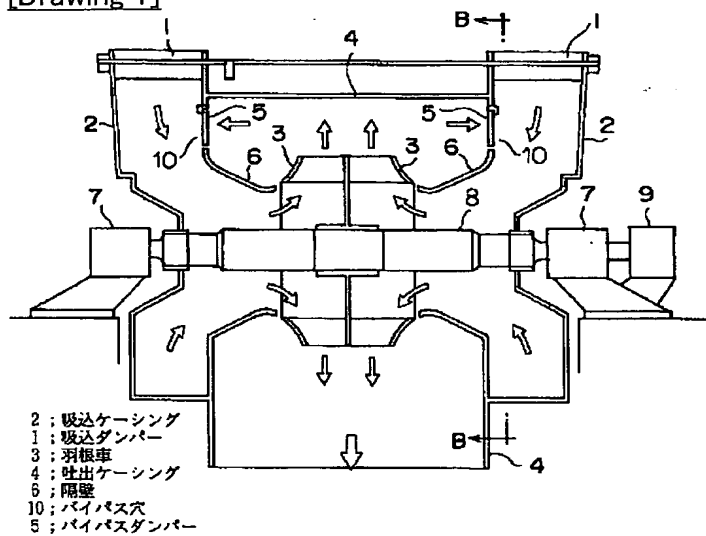
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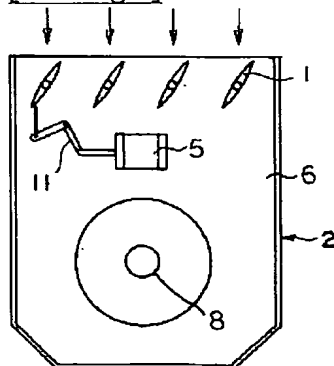
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DRAWINGS

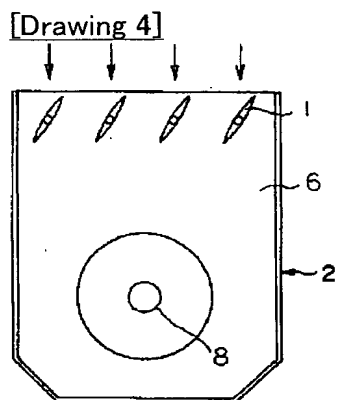
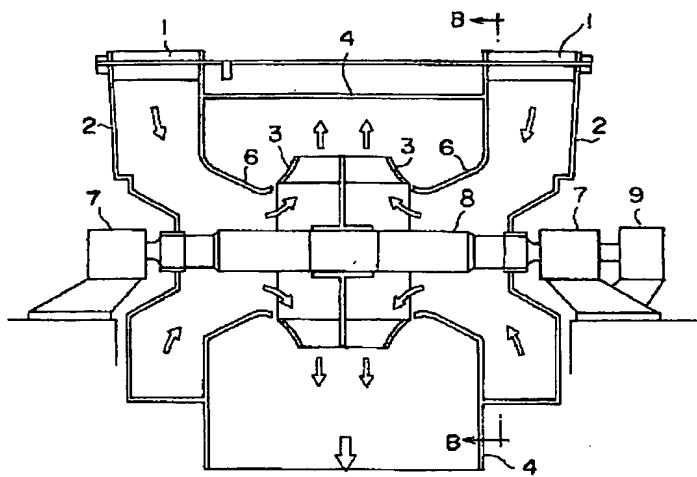
[Drawing 1]



[Drawing 2]



[Drawing 3]



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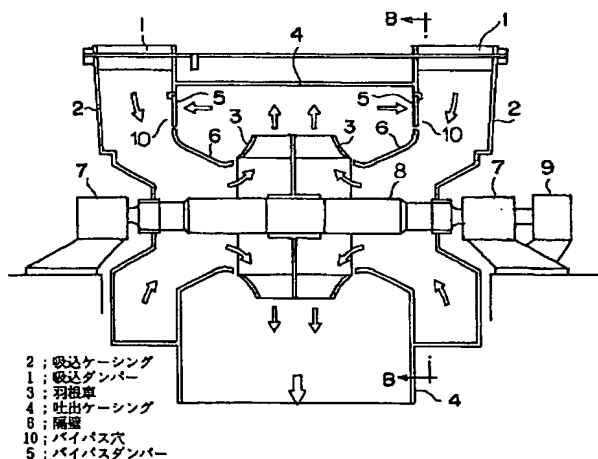
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(54) 【発明の名称】 遠心ファン

(57) 【要約】

【課題】 遠心ファンの低流量域において羽根車3に旋回失速が発生するのを防止する。

【解決手段】 吸込ケーシング2と吐出ケーシング4とを仕切る隔壁6にバイパス穴10を設け、このバイパス穴10を開閉するバイパスダンパー5を吸込ダンパー1に連動連結した。



【特許請求の範囲】

【請求項1】 吸込ケーシングに複数枚のブレードからなる吸込ダンパーを設けた遠心ファンにおいて、上記吸込ケーシングと吐出ケーシングを仕切る隔壁にバイパス穴を設け、このバイパス穴を開閉するバイパスダンパーを上記吸込ダンパーに連動連結したことを特徴とする遠心ファン。

【請求項2】 上記吸込ダンパーの開度が全閉のとき、上記バイパスダンパーが全開となり、上記吸込ダンパーの開度が約20%となったとき、上記バイパスダンパーが全閉となるように連動連結したことを特徴とする請求項1記載の遠心ファン。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明と遠心ファンに関する。

【0002】

【従来の技術】従来の遠心ファンの1例が図3及び図4に示され、図3は略示的縦断面図、図4は図3のB-B矢に沿う略示的横断面図である。図3及び図4において、1は吸込ダンパー、2は吸込ケーシング、3は羽根車、4は吐出ケーシング、7は軸受、8は回転軸、9は駆動モータである。

【0003】遠心ファンの運転時、駆動モータ9によって回転軸8が駆動されると、これに固定された羽根車3が回転し、これに伴って空気が吸込ダンパー1の複数枚のブレードの間隙及び吸込ケーシング2を通過して羽根車3に吸入され、この羽根車3によって昇圧された後、吐出ケーシング4を通過して吐出される。遠心ファンの風量及び圧力は吸込ダンパー1の開度を加減することによって制御される。

【0004】

【発明が解決しようとする課題】上記従来の遠心ファンにおいては、吸込ダンパー1の開度を約20%以下にすることによって遠心ファンの風量を低減すると、羽根車3に旋回失速が発生し、これに基づく羽根車3の回転数Nの $\frac{2}{3}$ 又は $\frac{3}{4}$ の周期の圧力変動によって遠心ファン及びその前後のダクトに振動が発生するという不具合があった。

【0005】

【課題を解決するための手段】本発明は上記課題を解決するために発明されたものであって、その要旨とするところは、吸込ケーシングに複数枚のブレードからなる吸込ダンパーを設けた遠心ファンにおいて、上記吸込ケーシングと吐出ケーシングを仕切る隔壁にバイパス穴を設け、このバイパス穴を開閉するバイパスダンパーを上記吸込ダンパーに連動連結したことを特徴とする遠心ファンにある。

【0006】他の特徴とするところは、上記吸込ダンパーの開度が全閉のとき、上記バイパスダンパーが全開と

なり、上記吸込ダンパーの開度が約20%となったとき、上記バイパスダンパーが全閉となるように連動連結したことにある。

【0007】しかし、吸込ダンパーに連動してバイパスダンパーが開閉され、バイパスダンパーが開となると、吐出ケーシング内の圧縮流体の一部がバイパス穴を通過して吸込ケーシング内に循環して再び羽根車に吸入される。

【0008】

【発明の実施の形態】本発明の実施形態が図1及び図2に示され、図1は略示的縦断面図、図2は図1のB-B線に沿う略示的横断面図である。吸込ケーシング2と吐出ケーシング4とを仕切る隔壁6にはバイパス穴10が形成され、このバイパス穴10はバイパスダンパー5によって開閉されるようになっている。

【0009】そして、このバイパスダンパー5は吸込ダンパー1のブレードの1つとリンク11を介して連動連結され、吸込ダンパー1が全閉のときに全開となり、吸込ダンパー1の開度が約20%となったときに全閉となるように構成されている。他の構成は図3及び図4に示す従来のものと同様であり、対応する部材には同じ符号を付してその説明を省略する。

【0010】しかし、遠心ファンの風量を低減するため吸込ダンパー1の開度を絞って行くと、その開度が約20%となったときにバイパスダンパー5が開き始め、吸込ダンパー1の開度が小さくなるのに応じてバイパスダンパー5の開度が大きくなり、吸込ダンパー1が全閉となるとバイパスダンパー5は全開となる。

【0011】かくして、バイパスダンパー5が開くと、羽根車3によって昇圧された空気の一部が吐出ケーシング4からバイパス穴10を通過して吸込ケーシング2に循環し、羽根車3には吸込ダンパー1の開度を約20%としたときに流れる量が吸い込まれるので、羽根車3に旋回失速が発生するのを防止できる。

【0012】以上、本発明を両吸込形遠心ファンを適用した例について説明したが、本発明は片吸込形の遠心ファンにも適用することができ、また、作動流体は空気に限らないことは勿論である。

【0013】

【発明の効果】本発明においては、吸込ダンパーに連動してバイパスダンパーが開閉され、バイパスダンパーが開となると、吐出ケーシング内の圧縮流体の一部がバイパス穴を通過して吸込ケーシング内に循環して再び羽根車に吸入される。従って、羽根車には常時旋回失速が生じない風量が流過するので、羽根車に旋回失速が生じるのを防止できる。この結果、旋回失速に基づく圧力変動及びこれに基づく遠心ファン及びダクトの振動を防止できるとともに吸込ダンパーの開度の如何に拘わらず遠心ファンを安定して運転することが可能となる。

【0014】吸込ダンパーの開度が全閉のとき、バイパ

スダンパーが全開となり、吸込ダンパーの開度が約20%となったとき、バイパスダンパーが全閉となるように連動連結すれば、遠心ファンの低流量域において所定の風量を羽根車に吸入させることができるので、羽根車の旋回失速を効果的に防止できる。

【図面の簡単な説明】

【図1】本発明の実施形態を示す略示的縦断面図である。

【図2】図1のB-B矢に沿う略示的横断面図である。

【図3】従来の遠心ファンの略示的縦断面図である。

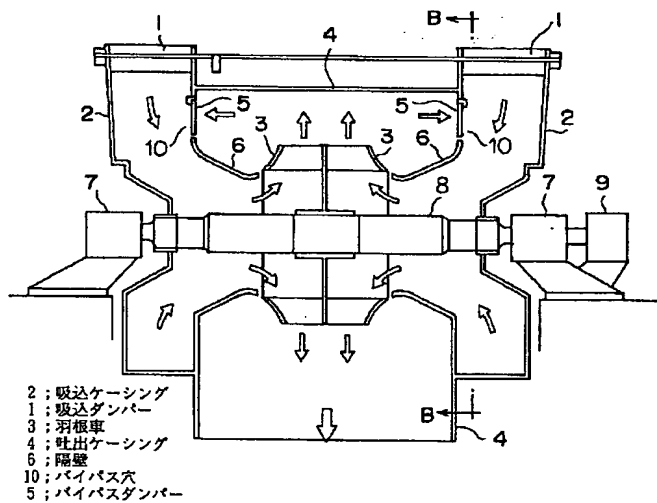
る。

【図4】図3のB-B矢に沿う略示的横断面図である。

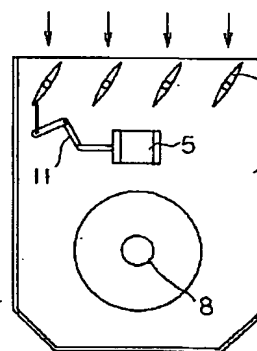
【符号の説明】

- 2 吸込ケーシング
- 1 吸込ダンパー
- 3 羽根車
- 4 吐出ケーシング
- 6 隔壁
- 10 バイパス穴
- 5 バイパスダンパー

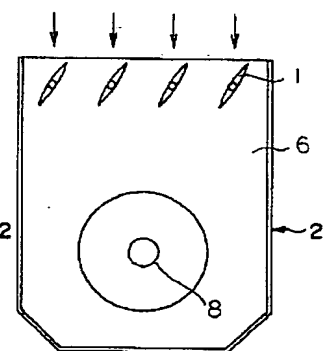
【図1】



【図2】



【図4】



【図3】

